



*ISTEP+: Grade 3*

Mathematics

Released Part 1 Applied Skills (open-ended) Items  
and Scoring Notes

## Introduction

The *ISTEP+* Spring 2016 test was administered to Indiana students in Grades 3-8 and 10. The test included two parts: Part 1 was given in March, and Part 2 took place in late April and early May. Part 1 contained Applied Skills test questions (also referred to as open-ended items) that were hand scored by trained evaluators, and Part 2 was machine scored. Scores for Part 1 and Part 2 are combined to generate a student's total score.

Test results, as well as images of the Applied Skills student responses, are available online, and schools are expected to discuss results with parents and students. As a springboard for these conversations and to serve as a resource for teachers, the Indiana Department of Education has created this document, which consists of the following:

- a brief description of the types of questions on the test
- a short summary of scoring rules utilized by the trained evaluators
- a copy of the rubrics—or scoring guides—used by evaluators to score student responses
- a copy of the released Applied Skills questions (*“released” means the items are posted on the web and are no longer secure; therefore, the released test items can be discussed and used with students as future practice items*)
- anchor papers—or sample student responses—used by evaluators to distinguish between score points

### Notes:

- The Part 1 open-ended questions are released when test results are made available.
- It is important to keep in mind that the majority of a student's score is calculated from items in Part 2. Since Part 2 items are secure and are not released, they are not included in this document.

## Question Types

This document addresses questions from *ISTEP+ Part 1*. Students demonstrate their knowledge and understanding by responding to items that are open-ended, providing written responses in a short-answer or essay-type format.

Part 1 consists of the following test question types: Constructed-Response (CR), Extended-Response (ER), and a Writing Prompt (WP). Item types vary by subject area. Math, Science, and Social Studies include CR and ER items. English/Language Arts includes CR and WP test questions.

## Scoring

The questions on *ISTEP+ Part 1* are scored by evaluators who must have a four-year college degree and pass a series of qualifying tests. Prior to scoring student responses, evaluators receive extensive training to ensure that student responses are scored accurately and consistently.

For Part 1 of *ISTEP+*, each question is scored according to a rubric, or scoring guide. Rubrics clearly define the requirements for each score point. A set of student responses representing all of the score points on a rubric are selected as anchor papers (exemplars) and are used as clear examples of specific score points. Samples of anchor papers are presented within this document.

ISTEP+ Part 1: Mathematics		
Question Type	Score Reporting Categories	Scoring Method
Constructed-Response (CR)	Algebraic Thinking Measurement Data Analysis Mathematical Process	2-pt. CR Rubric (Grades 3-8, 10)
Extended Response (ER)	Algebraic Thinking Measurement Data Analysis Mathematical Process	4-pt. ER Rubric (Grades 3-8, 10)

If a student's response is unable to be scored, it is assigned one of the following condition codes:

- A** Blank/No Response/Refusal
- B** Illegible
- C** Written predominantly in a language other than English
- D** Insufficient response/Copied from text
- E** Response not related to test questions or scoring rule (not applied to Mathematics questions)

More information is available regarding assessment topics on the Office of Student Assessment homepage at <http://www.doe.in.gov/assessment>.

## Constructed-Response Rubric

Content Rubric	
2	A score of two indicates a <b>thorough understanding</b> of the mathematical concepts embodied in the task. The response <ul style="list-style-type: none"> <li>shows algorithms, computations, and other content related work executed correctly and completely.</li> </ul>
1	A score of one indicates a <b>partial understanding</b> of the mathematical concepts embodied in the task. The response <ul style="list-style-type: none"> <li>contains errors in the execution of algorithms, computations, and/or other content related work.</li> </ul>
0	A score of zero indicates <b>limited or no understanding</b> of the mathematical concepts embodied in the task.
Process Rubric	
2	A score of two indicates a <b>thorough understanding</b> of the problem-solving concepts embodied in the task. The response <ul style="list-style-type: none"> <li>shows an appropriate strategy to solve the problem, and the strategy is executed correctly and completely.</li> <li>identifies all important elements of the problem and shows a complete understanding of the relationships among them.</li> <li>provides clear and complete explanations and/or interpretations when required.</li> </ul>
1	A score of one indicates a <b>partial understanding</b> of the problem-solving concepts embodied in the task. The response contains one or more of the following errors. The response <ul style="list-style-type: none"> <li>shows an appropriate strategy to solve the problem. However, the execution of the strategy contains errors and/or is incomplete.</li> <li>identifies some of the important elements of the problem and shows a general understanding of the relationships among them.</li> <li>provides incomplete, partial, or unclear explanations and/or interpretations when required.</li> </ul>
0	A score of zero indicates <b>limited or no understanding</b> of the problem-solving concepts embodied in the task.

### Clarification and Implementation Guidance

- Correct answers ONLY, on all parts of the problem with no work shown, will receive a maximum of 1 point in content and a maximum of 1 point in Problem Solving.
- A student can receive the top score point in Problem Solving if the strategy used would result in a correct answer even though the response contains computation errors.
- A student can receive the top score point in Problem Solving if an error made in the “content” portion is used with an appropriate strategy to solve the problem.

## Extended-Response Rubric

Content Rubric	
3	A score of three indicates a <b>thorough understanding</b> of the mathematical concepts embodied in the task. The response <ul style="list-style-type: none"> <li>shows algorithms, computations, and other content related work executed correctly and completely.</li> </ul>
2	A score of two indicates a <b>partial understanding</b> of the mathematical concepts embodied in the task. The response <ul style="list-style-type: none"> <li>shows an attempt to execute algorithms, computations, and other content related work correctly and completely; computation errors or other minor errors in the content related work may be present.</li> </ul>
1	A score of one indicates a <b>limited understanding</b> of the mathematical concepts embodied in the task. The response <ul style="list-style-type: none"> <li>contains major errors, or only a partial process.</li> <li>contains algorithms, computations, and other content related work which may only be partially correct.</li> </ul>
0	A score of zero indicates <b>no understanding</b> of the mathematical concepts embodied in the task.
Problem-Solving Rubric	
3	A score of three indicates a <b>thorough understanding</b> of the problem-solving concepts embodied in the task. The response <ul style="list-style-type: none"> <li>shows an appropriate strategy to solve the problem, and the strategy is executed correctly and completely.</li> <li>identifies all important elements of the problem and shows a complete understanding of the relationships among them.</li> <li>provides clear and complete explanations and/or interpretations when required.</li> </ul>
2	A score of two indicates a <b>partial understanding</b> of the problem-solving concepts embodied in the task. The response contains one or more of the following errors. The response <ul style="list-style-type: none"> <li>shows an appropriate strategy to solve the problem. However, the execution of the strategy lacks an essential element.</li> <li>identifies some of the important elements of the problem and shows a general understanding of the relationships among them.</li> <li>provides incomplete or unclear explanations and/or interpretations when required.</li> </ul>
1	A score of one indicates a <b>limited understanding</b> of the problem-solving concepts embodied in the task. The response contains one or more of the following errors. The response <ul style="list-style-type: none"> <li>shows an appropriate strategy to solve the problem. However, the execution of the strategy is applied incorrectly and/or is incomplete.</li> <li>shows a limited understanding of the relationships among the elements of the problem.</li> <li>provides incomplete, unclear, or omitted explanations and/or interpretations when required.</li> </ul>
0	A score of zero indicates <b>no understanding</b> of the problem-solving concepts embodied in the task.

### Clarification and Implementation Guidance

- Correct answers ONLY, on all parts of the problem with no work shown, will receive a maximum of 2 points in content and a maximum of 2 points in Problem Solving.
- A student can receive the top score point in Problem Solving if the strategy used would result in a correct answer even though the response contains computation errors.
- A student can receive the top score point in Problem Solving if an error made in the “content” portion is used with an appropriate strategy to solve the problem.

Item #1  
Constructed-Response

**Constructed-Response**  
**Standard 5: Measurement**  
**Standard 7: Mathematical Process**

**Question 1**

1. Jack is making a rectangular play area for his puppy.

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$

**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
<b>Play Area A</b>	12		72
<b>Play Area B</b>		8	72
<b>Play Area C</b>	11	5	

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

**Answer** \_\_\_\_\_ feet



**Exemplary Response:**

<b>Play Area Sizes</b>			
	<b>Length (feet)</b>	<b>Width (feet)</b>	<b>Area (square feet)</b>
<b>Play Area A</b>	12	6	72
<b>Play Area B</b>	9	8	72
<b>Play Area C</b>	11	5	55

AND

- 7 feet
- Sample Process:

$$72 / 12 = 6$$

$$72 / 8 = 9$$

$$11 \times 5 = 55$$

$$9 \times 1 = 8$$

$$58 / 8 = 7$$

OR

- Other valid process

Question 1, Sample A – Measurement Score Point 2; Process Score Point 2

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$

**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
Play Area A	12	8	72
Play Area B	9	8	72
Play Area C	11	5	55

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

The student has drawn a rectangle with a length of 9 and a width of 7. To the right of the rectangle, there is a division problem:  $56 \div 8 = 7$ . The student has also written the number 7 below the rectangle, indicating the width.

**Answer** 7 feet

*Scoring Notes: The response demonstrates a thorough understanding of finding the area of rectangles by correctly completing the table. The response demonstrates a thorough understanding of reasoning quantitatively by finding the correct width of the play area with a valid process. This response receives two points for content and two points for process.*

Question 1, Sample B – Measurement Score Point 2; Process Score Point 1

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$

**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
Play Area A	12	6	72
Play Area B	9	8	72
Play Area C	11	5	55

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

**Answer** 7 feet

*Scoring Notes: The response demonstrates a thorough understanding of finding the area of rectangles by correctly completing the table. The response demonstrates a partial understanding of reasoning quantitatively by finding the width of the play area; however, the response does not provide a valid process. This response receives two points for content and one point for process.*

Question 1, Sample C – Measurement Score Point 1; Process Score Point 2

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$

**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
<b>Play Area A</b>	12	4	72
<b>Play Area B</b>	9	8	72
<b>Play Area C</b>	11	5	55

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

$$\begin{array}{r} 9 \\ -1 \\ \hline 8 \end{array} \times 7 = 56$$

**Answer** 7 feet

*Scoring Notes: The response demonstrates a partial understanding of finding the area of rectangles by correctly finding two of the three values in the table. The response demonstrates a thorough understanding of reasoning quantitatively by finding the correct width of the play area with a valid process. This response receives one point for content and two points for process.*

Question 1, Sample D – Measurement Score Point 1; Process Score Point 0

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$

**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
<b>Play Area A</b>	12	6	72
<b>Play Area B</b>	12	8	72
<b>Play Area C</b>	11	5	55

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

Handwritten work:

$$\begin{array}{r}
 18 \text{ ft.} \\
 5 \text{ ft.} \\
 + 6 \text{ ft.} \\
 \hline
 19 \text{ ft.}
 \end{array}$$

Answer: 19 feet

*Scoring Notes: The response demonstrates a partial understanding of finding the area of rectangles by correctly finding two of the three values in the table. The response demonstrates limited understanding of reasoning quantitatively by finding an incorrect width of the play area with an invalid process to find the width. This response receives one point for content and zero points for process.*



Question 1, Sample E – Measurement Score Point 0; Process Score Point 1

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$

**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
Play Area A	12	6	72
Play Area B	8	8	72
Play Area C	11	5	27

$$\begin{array}{r} 12 \\ \times 12 \\ \hline 24 \\ 72 \\ \hline 144 \end{array}$$

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

$$\begin{array}{r} 11 \\ \times 11 \\ \hline 11 \\ 110 \\ \hline 121 \end{array}$$

**Answer** 8722 feet

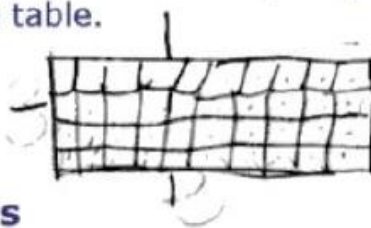
*Scoring Notes: The response demonstrates a limited understanding of finding the area of rectangles as all three values in the table are incorrect. The response demonstrates a partial understanding of reasoning quantitatively by finding the correct width of the play area but with an invalid process. This response receives zero points for content and one point for process.*

Question 1, Sample F – Measurement Score Point 0; Process Score Point 0

**Part A**

Jack looks at three sizes of play areas. Fill in the missing length, width, and area of the play areas in the table.

$$\text{Area of rectangle} = l \times w$$



**Play Area Sizes**

	Length (feet)	Width (feet)	Area (square feet)
Play Area A	12	40	72
Play Area B	132	8	72
Play Area C	11	5	172

**Part B**

Jack makes a play area that has

- a length equal to 1 foot less than the length of Play Area B and
- an area equal to 56 square feet.

What is the width, in feet, of the play area Jack makes?

**Show All Work**

$$\begin{array}{r} 40 \\ + 132 \\ \hline 172 \end{array}$$

$$\begin{array}{l} 8 \times 5 = 40 \\ 12 \times 11 = 132 \end{array}$$

$$\begin{array}{r} 12 \\ \times 11 \\ \hline 12 \\ + 110 \\ \hline 132 \end{array}$$

**Answer** 172 feet

*Scoring Notes: The response demonstrates a limited understanding of finding the area of rectangles as all three values in the table are incorrect. The response demonstrates a limited understanding of reasoning quantitatively by finding the incorrect width of the play area with an invalid process. This response receives zero points for content and zero points for process.*

Item #2  
Constructed-Response



**Constructed-Response**  
**Standard 3: Algebraic Thinking**  
**Standard 7: Mathematical Process**

**Question 2**

- 2.** Nick and Sam each have a yard sale.

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.  
Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books		166	351
Toys	45	97	

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

\_\_\_\_\_

**Part C**

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

**Show All Work**

**Answer** \_\_\_\_\_ books and toys

**Exemplary Response:**

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books	185	166	351
Toys	45	97	142

AND

- $351 - 166 = ?$

OR

- Other valid response

AND

- 94 books and toys
- **Sample Process:**

$$351 - 166 = 185$$

$$185 + 45 = 230$$

$$230 - 136 = 94$$

OR

Other valid process

Question 2, Sample A – Algebraic Thinking Score Point 2; Process Score Point 2

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.

Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books	185	166	351
Toys	45	97	142

$$\begin{array}{r} 214 \\ 851 \\ - 166 \\ \hline 195 \\ 45 \\ + 97 \\ \hline 142 \end{array}$$

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

$$351 - 166 = 185$$

**Number Sentence** \_\_\_\_\_

**Part C**

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

**Show All Work**

$$\begin{array}{r} 185 \\ + 45 \\ \hline 230 \end{array} \quad \begin{array}{r} 230 \\ + 136 \\ \hline 366 \end{array}$$

**Answer** 94 books and toys

*Scoring Notes: The response demonstrates a thorough understanding of solving multi-step, real-world problems by providing a correct number sentence in Part B and a valid setup for Part C. The response demonstrates a thorough understanding of persevering in solving problems by correctly completing the table in Part A and correctly finding an answer of 94 for Part C. This response receives two points for content and two points for process.*

Question 2, Sample B – Algebraic Thinking Score Point 2; Process Score Point 1

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.

Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books	185	166	351
Toys	45	97	132

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

**Number Sentence**

$$351 - 166 = 185$$

**Part C**

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

**Show All Work**

$$\begin{array}{r} 102 \phantom{0} 9 \\ 136 \\ \hline 94 \end{array}$$

$$\begin{array}{r} 11 \\ 185 \\ + 45 \\ \hline 230 \end{array}$$

$$\begin{array}{r} 11 \\ 185 \\ + 45 \\ \hline 230 \end{array}$$

**Answer** 94 books and toys

*Scoring Notes: The response demonstrates a thorough understanding of solving multi-step, real-world problems by providing a correct number sentence in Part B and a valid setup for Part C. The response demonstrates a partial understanding of persevering in solving problems by correctly finding an answer of 94 for Part C. However, the response incorrectly completes the table in Part A. This response receives two points for content and one point for process.*

Question 2, Sample C – Algebraic Thinking Score Point 1; Process Score Point 2

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.

Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books	185	166	351
Toys	45	97	142

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

**Number Sentence**  $185 + 45 = 230$

$$\begin{array}{r}
 166 \\
 + 185 \\
 \hline
 351
 \end{array}
 \quad
 \begin{array}{r}
 21411 \\
 351 \\
 - 166 \\
 \hline
 185
 \end{array}
 \quad
 \begin{array}{r}
 45 \\
 + 97 \\
 \hline
 142
 \end{array}
 \quad
 \begin{array}{r}
 1312 \\
 142 \\
 - 45 \\
 \hline
 97
 \end{array}$$

**Part C**

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

**Show All Work**

$$\begin{array}{r}
 230 \\
 - 136 \\
 \hline
 94
 \end{array}
 \quad
 \begin{array}{r}
 194 \\
 + 136 \\
 \hline
 230
 \end{array}$$

**Answer** 94 books and toys

*Scoring Notes: The response demonstrates a partial understanding of solving multi-step, real-world problems by providing a valid setup for Part C but an incorrect number sentence in Part B. The response demonstrates a thorough understanding of persevering in solving problems by correctly completing the table in Part A and correctly finding an answer of 94 for Part C. This response receives one point for content and two points for process.*

Question 2, Sample D – Algebraic Thinking Score Point 1; Process Score Point 1

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.

Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books	185	166	351
Toys	45	97	142

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

**Number Sentence**

$$\begin{array}{l} \boxed{\text{Books}} \quad 185 + 166 = 351 \\ \boxed{\text{Toys}} \quad 45 + 97 = 142 \end{array}$$

$$\begin{array}{r} 1 \\ 97 \\ + 45 \\ \hline 142 \end{array}$$

$$\begin{array}{r} 24 \\ 3811 \\ - 166 \\ \hline 185 \end{array}$$



### Part C

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

**Show All Work**

Answer 311 books and toys

$$\begin{array}{r} 4 \\ 3811 \\ - 136 \\ \hline 215 \\ + 6 \\ \hline 311 \end{array}$$

$$\begin{array}{r} 3 \\ 14212 \\ - 136 \\ \hline 006 \end{array}$$

*Scoring Notes: The response demonstrates a partial understanding of solving multi-step, real-world problems by providing a correct number sentence in Part B but an invalid setup for Part C. The response demonstrates a partial understanding of persevering in solving problems by correctly completing the table in Part A. However, the response has a calculation error in Part C ( $215+6=311$ ). This response receives one point for content and one point for process.*



Question 2, Sample E – Algebraic Thinking Score Point 0; Process Score Point 1

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.

Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books	185	166	351
Toys	45	97	142

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

Number Sentence  $185 + 45 = 230$

$$\begin{array}{r} 214 \\ 351 \\ -166 \\ \hline 185 \end{array} + \begin{array}{r} 97 \\ 45 \\ \hline 142 \end{array}$$

$$\begin{array}{r} 185 \\ + 45 \\ \hline 230 \end{array}$$

### Part C

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

Show All Work

$$\begin{array}{r} 97 \\ -45 \\ \hline 52 \end{array}$$

$$\begin{array}{r} 90 \text{ toys} \end{array}$$

Answer 90 books and toys

$$\begin{array}{r} 212 \\ 212 \\ 212 \\ \hline 636 \end{array}$$

$$\begin{array}{r} 248 \end{array}$$

$$\begin{array}{r} 14 \\ 4 \\ 235 + 11 \\ - 185 \\ \hline \end{array}$$

$$\begin{array}{r} 166 \\ -166 \\ \hline 000 \end{array}$$

*Scoring Notes: The response demonstrates a limited understanding of solving multi-step, real-world problems by providing an incorrect number sentence in Part B and an invalid setup for Part C. The response demonstrates a limited understanding of persevering in solving problems by correctly completing the table in Part A but finding an incorrect answer for Part C. This response receives zero points for content and one point for process.*

Question 2, Sample F; Algebraic Thinking Score Point 0, Process Score Point 0

**Part A**

The table shows the number of books and toys Nick sells at his yard sale.

Complete the table by filling in the two missing numbers.

**Nick's Yard Sale**

Item	Sold	Not Sold	Total
Books		166	351
Toys	45	97	

**Part B**

Write a number sentence that can be used to find the number of BOOKS Nick sells.

Number Sentence \_\_\_\_\_

$$\begin{array}{r} 14 \\ 45 \\ - 97 \\ \hline 57 \end{array}$$

$$\begin{array}{r} 05 \\ 166 \\ - 351 \\ \hline 305 \end{array}$$

$$\begin{array}{r} 57 \\ - 35 \\ \hline 22 \end{array}$$

### Part C

At Sam's yard sale, he sells 136 fewer books and toys than the number Nick sells.

What is the total number of books and toys that Sam sells?

**Show All Work**

Answer 5 books and toys

$$\begin{array}{r} 136 \\ - 351 \\ \hline 005 \end{array}$$

*Scoring Notes: The response demonstrates a limited understanding of solving multi-step, real-world problems by providing an incorrect number sentence in Part B and an invalid process for Part C. The response demonstrates a limited understanding of persevering in solving problems by incorrectly completing the table in Part A and providing an answer with a calculation error ( $136 - 351 = 005$ ) in Part C. This response receives zero points for content and zero points for process.*

Item #3  
Constructed-Response

**Constructed-Response**  
**Standard 6: Data Analysis**  
**Standard 7: Mathematical Process**

**Question 3**

**3.** Mike builds a doghouse. He uses

- 10 boards,
- 2 nails for every board used,
- and 6 shingles for every 2 boards used.

**Part A**

How many shingles does Mike use?

**Show All Work**

**Answer** \_\_\_\_\_ shingles

**Part B**

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

**Doghouse**

Item	Number of Items
Boards	
Nails	
Shingles	

**KEY**

$x = 5$  items

**Exemplary Response:**

- 30 shingles

AND

- **Sample Process:**

$$6 / 2 = 3$$

$$3 \times 10 = 30$$

OR

Other valid process

AND

**Doghouse**

Item	Number of Items
Boards	X X
Nails	X X X X
Shingles	X X X X X X

Question 3, Sample A – Data Analysis Score Point 2; Process Score Point 2

**3** Mike builds a doghouse. He uses

- 10 boards,
- 2 nails for every board used,
- and 6 shingles for every 2 boards used.

**Part A**

How many shingles does Mike use?

**Show All Work**

$s = \text{shingles}$   
 $b = \text{boards}$

2 boards  
6 shingles

4 b  
12 s

6 b  
18 s

8 b  
24 s

10 b  
30 s

**Answer** 30 shingles



## Part B

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

### Doghouse

Item	Number of Items
Boards	x x
Nails	x x x x
Shingles	x x x x x x

KEY
x = 5 items

2 nails for every board used

10 boards

$10 \times 2 = 20$

*Scoring Notes: The response demonstrates a thorough understanding of data analysis by creating a valid picture graph. The response demonstrates a thorough understanding of reasoning quantitatively by finding a correct number of shingles with a valid process. This response receives two points for content and two points for process.*

Question 3, Sample B – Data Analysis Score Point 2, Process Score Point 0

- 3** Mike builds a doghouse. He uses
- 10 boards,
  - 2 nails for every board used,
  - and 6 shingles for every 2 boards used.

**Part A**

How many shingles does Mike use?

**Show All Work**

$$\begin{array}{r} 18 \\ \times 6 \\ \hline 44 \end{array}$$
$$\begin{array}{r} 510 \\ - 16 \\ \hline 44 \end{array}$$

**Answer** 44 shingles

## Part B

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

### Doghouse

Item	Number of Items
Boards	X X
Nails	X X X X
Shingles	X X X X X X X X X

KEY
x = 5 items

*Scoring Notes: The response demonstrates a thorough understanding of data analysis by creating a valid picture graph based on the incorrect number of shingles that the student found in Part A. The response demonstrates a limited understanding of reasoning quantitatively by finding an incorrect number of shingles with an invalid process. This response receives two points for content and zero points for process.*

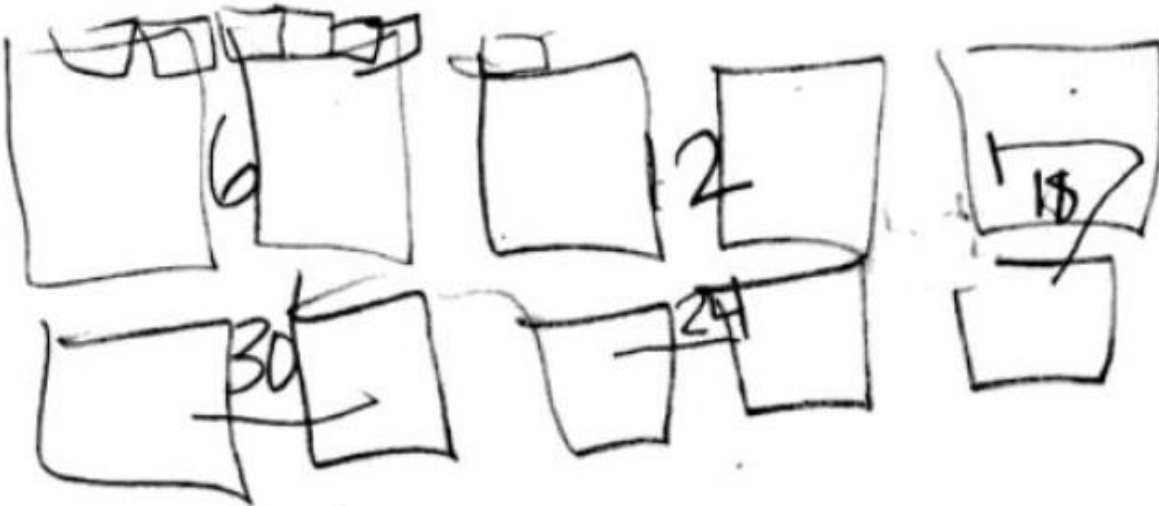
Question 3, Sample C – Data Analysis Score Point 1; Process Score Point 2

**Part A**

How many shingles does Mike use?

**Show All Work**

Answer 30 shingles



## Part B

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

### Doghouse

Item	Number of Items
Boards	XX
Nails	XX
Shingles	XX XX XX X

KEY
x = 5 items



*Scoring Notes: This response demonstrates a partial understanding of data analysis by correctly creating the picture graph for only the Boards and Shingles. The response demonstrates a thorough understanding of reasoning quantitatively by finding the correct number of shingles with a valid process. This response receives one point for content and two points for process.*

Question 3, Sample D – Data Analysis Score Point 1; Process Score Point 0

**Part A**

How many shingles does Mike use?

**Show All Work**

612 18 24 30  
36 42 48 54  
59 65 71

Answer 59 shingles

**Part B**

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

**Doghouse**

Item	Number of Items
Boards	10
Nails	20
Shingles	59

KEY
x = 5 items

*Scoring Notes: The response demonstrates a partial understanding of data analysis by placing the correct number of items in the picture graph, but the response did not follow the key when creating the picture graph. The response demonstrates a limited understanding of reasoning quantitatively by finding an incorrect number of shingles with an invalid process. This response receives one point for content and zero points for process.*

Question 3, Sample E – Data Analysis Score Point 0; Process Score Point 2

**3** Mike builds a doghouse. He uses

- 10 boards,
- 2 nails for every board used,
- and 6 shingles for every 2 boards used.

**Part A**

How many shingles does Mike use?

**Show All Work**

Answer 30 shingles

$$\begin{array}{r} 30 \\ \times 2 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \\ + 6 \\ \hline 18 \\ + 6 \\ \hline 24 \\ + 6 \\ \hline 30 \end{array}$$

**Part B**

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

**Doghouse**

Item	Number of Items
Boards	10
Nails	60
Shingles	30

<b>KEY</b>
x = 5 items

*Scoring Notes: The response demonstrates a limited understanding of data analysis by creating an incorrect picture graph. The response demonstrates a thorough understanding of reasoning quantitatively by finding a correct number of shingles with a valid process. This response receives zero points for content and two points for process.*



Question 3, Sample F – Data Analysis Score Point 0; Process Score Point 0

**3** Mike builds a doghouse. He uses

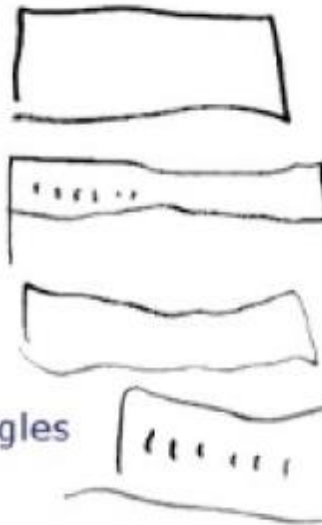
- 10 boards,
- 2 nails for every board used,
- and 6 shingles for every 2 boards used.

**Part A**

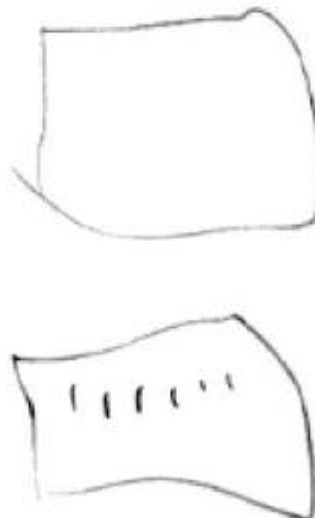
How many shingles does Mike use?

**Show All Work**

$$\begin{array}{r} 10 \\ \times 2 \\ \hline 20 \end{array}$$



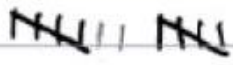
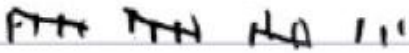

**Answer** 18 shingles



## Part B

Complete the picture graph to show the number of boards, nails, and shingles Mike uses to build the doghouse.

### Doghouse

Item	Number of Items
Boards	
Nails	
Shingles	

KEY
x = 5 items

*Scoring Notes: The response demonstrates a limited understanding of data analysis by creating an incorrect picture graph. The response demonstrates a limited understanding of reasoning quantitatively by incorrectly finding the number of shingles with an invalid process. This response receives zero points for content and zero points for process.*

Item #4  
Extended-Response

**Extended-Response**  
**Standard 5: Measurement**  
**Standard 7: Mathematical Process**

**Question 4**

- 4.** Mark places toothpicks end to end to make the sides of three shapes.

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**

**Answer** \_\_\_\_\_ toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**

**Answer** \_\_\_\_\_ toothpicks

**Part C**

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

**Show All Work**

**Answer** \_\_\_\_\_ toothpicks

**Exemplary Response:**

- 24 toothpicks

AND

- 6 toothpicks

AND

- 5 toothpicks

AND

- Sample Process:

$$8 + 8 + 8 = 24$$

$$24 / 4 = 6$$

$$22 - 6 - 6 = 10$$

$$10 / 2 = 5$$

OR

- Other valid process

**Question 4, Sample A – Measurement Score Point 3; Process Score Point 3**

Mark places toothpicks end to end to make the sides of three shapes.

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**

$$\begin{array}{r} 8 \\ +8 \\ \hline 16 \end{array} \quad \begin{array}{r} 16 \\ +8 \\ \hline 24 \end{array}$$

**Answer** 24 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**

$$\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$$

**Answer** 6 toothpicks

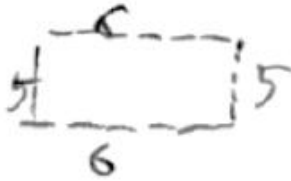
### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

**Show All Work**



Answer 5 toothpicks

*Scoring Notes: The response demonstrates a thorough understanding of how to determine the perimeter of polygons with a valid setup in Parts A, B, and C. The response demonstrates a thorough understanding of making sense of problems and persevering in solving those problems with a correct number of toothpicks in Parts A, B, and C. This response receives three points for content and three points for process.*



Question 4, Sample B – Measurement Score Point 3; Process Score Point 2

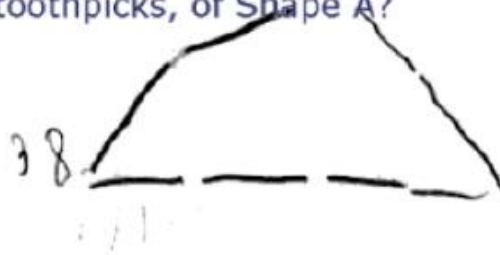
**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**

$$\begin{array}{r} 8 \\ + 8 \\ \hline 16 \\ + 8 \\ \hline 24 \end{array}$$



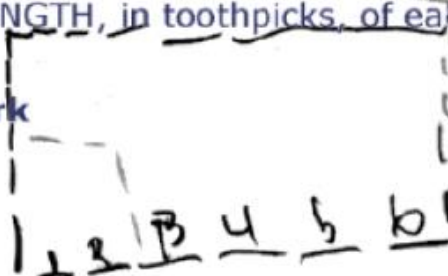
**Answer** 24 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**



**Answer** 6 toothpicks

### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

Show All Work

$$\begin{array}{r} 6 \\ 6 \\ \hline 12 \\ + 10 \\ \hline 22 \end{array}$$

$$2 \times 6 + 2 \times 4 = 22$$

$$12 + 10 = 22$$

Answer 10 4 toothpicks

*Scoring Notes: The response demonstrates a thorough understanding of how to determine the perimeter of polygons with a valid setup in Parts A, B, and C. The response demonstrates a partial understanding of making sense of problems and persevering in solving those problems with a correct number of toothpicks in Parts A and B but an incorrect number of toothpicks for Part C. This response receives three points for content and two points for process.*

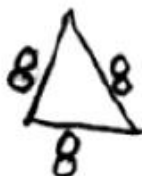
Question 4, Sample C – Measurement Score Point 2; Process Score Point 2

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**



Answer 24 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**



Answer 32 toothpicks

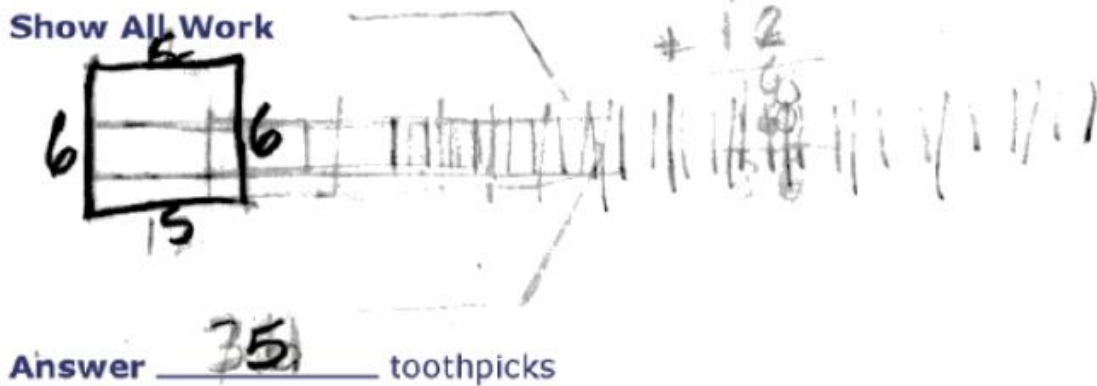
### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

Show All Work



*Scoring Notes: The response demonstrates a partial understanding of how to determine the perimeter of polygons with a valid setup in Parts A and C only. The response demonstrates a partial understanding of making sense of problems and persevering in solving those problems with a correct number of toothpicks in Parts A and C only. This response receives two points for content and two points for process.*

**Question 4, Sample D – Measurement Score Point 2; Process Score Point 1**

Mark places toothpicks end to end to make the sides of three shapes.

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**

$$8 \times 3 = 24$$

**Answer** 24 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**

$$8 \times 4 = 32$$

**Answer** 32 toothpicks

### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

Show All Work

$$\begin{array}{r} 6 \times 2 = 12 \\ + \\ 5 \times 2 = 10 \\ \hline 22 \end{array}$$

Answer 10 toothpicks

*Scoring Notes: The response demonstrates a partial understanding of how to determine the perimeter of polygons with a valid setup in Parts A and C only. The response demonstrates a limited understanding of making sense of problems and persevering in solving those problems with a correct number of toothpicks in Part A only. This response receives two points for content and one point for process.*

Question 4, Sample E – Measurement Score Point 1; Process Score Point 2

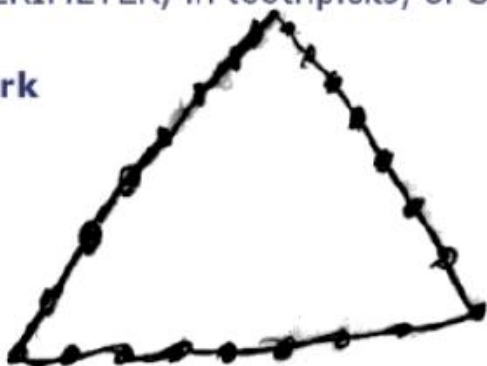
Mark places toothpicks end to end to make the sides of three shapes.

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**



$$\begin{array}{r} 8 \\ \times 3 \\ \hline 24 \end{array}$$

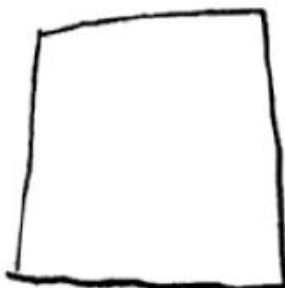
Answer 24 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**



Answer 6 toothpicks


### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

**Show All Work**

$$\begin{array}{r} \times 6 \\ 4 \\ \hline 24 \end{array} \quad \begin{array}{r} \times 6 \\ 3 \\ \hline 18 \end{array} \quad \begin{array}{r} \times 8 \\ 12 \\ \hline \end{array}$$


Answer 3½ toothpicks

*Scoring Notes: The response demonstrates a limited understanding of how to determine the perimeter of polygons with a valid setup in Part A only. The response demonstrates a partial understanding of making sense of problems and persevering in solving those problems with a correct number of toothpicks in Parts A and C only. This response receives one point for content and two points for process.*



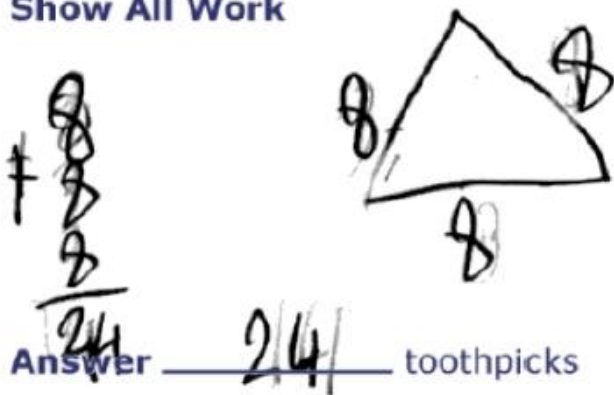
Question 4, Sample F – Measurement Score Point 1; Process Score Point 1

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**

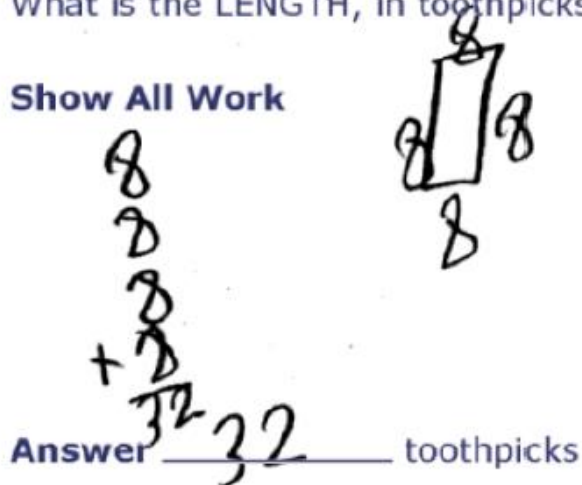


**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**



### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

Show All Work

Handwritten work showing a rectangle diagram and a calculation:

Diagram: A rectangle with a length of 6 toothpicks and a width of 2 toothpicks. The perimeter is labeled as 22 toothpicks on each side.

Calculation:

$$\begin{array}{r} 22 \\ + 22 \\ + 66 \\ \hline 110 \end{array}$$

Answer 110 toothpicks

*Scoring Notes: The response demonstrates a limited understanding of how to determine the perimeter of polygons with a valid setup in Part A only. The response demonstrates a limited understanding of making sense of problems and persevering in solving those problems with a correct number of toothpicks in Part A only. This response receives one point for content and one point for process.*

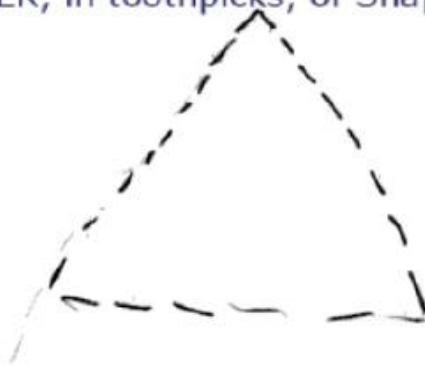
Question 4, Sample G – Measurement Score Point 0; Process Score Point 0

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**



Answer 23 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**

$$\begin{array}{r} \text{Shape A } 3 \\ + \text{ Shape B } 4 \\ \hline 7 \end{array}$$

Answer 7 toothpicks

### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

**Show All Work**

$$\begin{array}{r} 6 + 6 = 12 \\ \hline L = 6 \\ w = 12 \end{array}$$

**Answer** 12 toothpicks

*Scoring Notes: The response demonstrates limited or no understanding of how to determine the perimeter of polygons with an invalid setup for Parts A, B, and C. The response demonstrates limited or no understanding of making sense of problems and persevering in solving those problems with an incorrect number of toothpicks in Parts A, B, and C. This response receives zero points for content and zero points for process.*

**Question 4, Sample H – Measurement Score Point 0; Process Score Point 0**

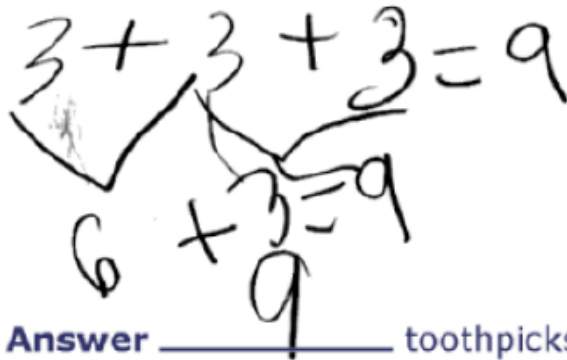
Mark places toothpicks end to end to make the sides of three shapes.

**Part A**

Shape A has 3 sides. Each side is 8 toothpicks long.

What is the PERIMETER, in toothpicks, of Shape A?

**Show All Work**



The student has drawn a triangle and written the following work:

$$3 + 3 + 3 = 9$$
$$6 + 3 = 9$$

The number 6 is written below the first side of the triangle, and the number 9 is written below the second side of the triangle.

Answer 9 toothpicks

**Part B**

Mark makes Shape B using the same number of toothpicks used in Shape A. Shape B has 4 sides of equal length.

What is the LENGTH, in toothpicks, of each side of Shape B?

**Show All Work**

$$3 + 1$$

4

Answer 4 toothpicks

### Part C

Mark uses 22 toothpicks to make Shape C. It is a rectangle that has a length of 6 toothpicks.

What is the WIDTH, in toothpicks, of Shape C?

$$\text{Perimeter of rectangle} = 2 \times l + 2 \times w$$

**Show All Work**

$$22 + 6 = 28$$

Answer 28 toothpicks

*Scoring Notes: The response demonstrates limited or no understanding of how to determine the perimeter of polygons with an invalid setup for Parts A, B, and C. The response demonstrates limited or no understanding of making sense of problems and persevering in solving those problems with an incorrect number of toothpicks in Parts A, B, and C. This response receives zero points for content and zero points for process.*